

CLAIMS

1. An apparatus for inserting stitches of uniform length through a stack of one or more fabric layers, said apparatus comprising:
  - a fixedly located stitch head including a needle mounted for cyclic vertical movement;
  - a bed defining a substantially horizontally oriented first planar surface mounted opposite to said stitch head;
  - a frame configured to retain a fabric layer stack in a substantially taut condition adjacent to said first planar surface;
  - means supporting said frame for manually guided movement to move said stack across said first planar surface;
  - a detector for producing one or more signals representing the magnitude of translational movement of said frame; and
  - control means responsive to said detector signals indicating a magnitude of translational movement exceeding a threshold magnitude for causing said needle to execute a cyclic movement from an up position remote from said stack, to a down position piercing said stack, and back to said up position.
2. The apparatus of claim 1 including a substantially horizontal oriented second planar surface; and wherein
  - said means supporting said frame includes bearings engaging said second planar surface.
3. The apparatus of claim 2 wherein said bearings comprise wheels.
4. The apparatus of claim 2 wherein said bearings comprise slide members.
5. The apparatus of claim 2 wherein said detector is coupled to said frame for movement therewith.
6. The apparatus of claim 5 wherein said detector comprises an optical detector responsive to light reflected from said second planar surface.

7. The apparatus of claim 2 wherein said detector comprises at least one arm linked to said frame for movement therewith and means responsive to movement of said arm for producing said signals.

8. A method of forming successive stitches of uniform length through a stack of fabric layers, said method comprising:

mounting an actuatable stitch head at a fixed location above a planar surface;

mounting a stack of fabric layers to a frame;

manually moving said frame to guide said stack across said planar surface;

detecting the movement of said frame; and

actuating said stitch head in response to a magnitude of frame movement greater than a threshold magnitude to cause a needle in said stitch head to move from an up position remote from said stack, to a down position piercing said stack, and back to said up position

9. The method of claim 8 wherein stitch head is actuated at a rate proportional to the rate of translational movement of said frame.

10. A method of forming successive stitches of uniform length through a stack of fabric layers, said method comprising:

mounting an actuatable stitch head at a fixed location above a planar surface;

mounting a stack of fabric layers to a frame;

manually moving said frame to guide said stack across said planar surface;

detecting the movement of said frame; and

controlling said stitch head to cause a needle to execute cyclic movements at a rate proportional to the speed of movement of said frame.

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11. An apparatus for inserting stitches of uniform length through a stack of one or more fabric layers, said apparatus comprising:

a fixedly located stitch head including a needle mounted for cyclic vertical movement;

a bed defining a substantially horizontally oriented first planar surface mounted opposite to said stitch head;

a frame configured to retain a fabric layer stack in a substantially taut condition adjacent to said first planar surface;

means supporting said frame for manually guided movement across a substantially horizontally oriented second planar surface to move said stack across said first planar surface;

a detector for measuring the movement of said frame across said second planar surface; and

control means for causing said needle to execute cyclic movements at a rate substantially proportional to the rate of frame movement measured by said detector.

12. Apparatus for use in combination with a sewing machine which includes a drive subsystem configured to cycle a needle through a path of vertical movement from an up position to a down position and back to said up position, said apparatus comprising:

a frame;

means for removably securing a stack of one or more fabric layers to said frame;

bearing means mounting said frame for hand guided movement across a planar surface;

detector means for producing signals representing the magnitude of translational movement of said frame across said planar surface; and

means for coupling said signals to said drive subsystem to synchronize the cycle rate of said needle to the translational movement of said frame.

13. The apparatus of claim 12 wherein said bearing means comprises at least one wheel.

14. The apparatus of claim 12 wherein said detector means produces signals representing the magnitude of frame translation along first and second perpendicular directions.

15. The apparatus of claim 12 wherein  
said means for coupling is adapted to apply said signals to said drive  
subsystem to initiate a needle cycle in response to frame translation exceeding a threshold  
magnitude.

16. The apparatus of claim 12 wherein said drive subsystem includes speed control  
circuitry; and wherein

    said means for coupling is adapted to apply said signals to said speed control  
circuitry.

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